BEDSIDE MEDICINE FOR BEDSIDE DOCTORS

An open forum for brief discussions of the workaday problems of the bedside doctor. Suggestions for subjects for discussion invited.

THE CAUSES OF ANGINA PECTORIS

ROBERT WILLIAM LANGLEY, LOS ANGELES.—We are still far from having an exact conception of the mystery of pain in angina pectoris. Assuming, with MacKenzie, that the pain is an expression of heart muscle fatigue or anemia, the causes then are those which produce degenerative changes in either the heart or blood vessels or both. A definite symptom complex arises on the basis of the above pathological changes, and this we call angina pectoris.

No doubt true angina may occasionally be found on the basis of spasm of the vessels at the base of the heart and theoretically upon the basis of a spasm of the coronary vessels, but on the whole, actual pathological changes tending toward the production of sclerosis in these vessels are to be found in the great majority of cases.

The time-worn expression "the wear and tear of life" while not conveying a great deal to the average layman must certainly be considered an important causative factor in angina pectoris. The stress of the busy commercial world, the tremendous pressure and worry to which so many individuals are subjected constantly, are very important causative factors. When these factors are combined with prolonged irritation, such as repeated bacterial or parasitic invasion, overindulgence in alcoholic stimulants, tobacco and other toxins, high blood pressure and its consequent degenerative changes, the true manifestations of angina pectoris are frequently found. The incidence of this affection is greater by far in individuals with highly organized nervous systems whose lives show achievements in fields of mental endeavor. Certain classes apparently are affected more than others. The occurrence among Jews is very common while rather uncommon in the negro, for instance.

MacKenzie, after analyzing hundreds of cases, divided them into five groups as follows:

1. People in advanced life, about fifty-five and over, in whom the changes in the arteries are leading to a deficient supply of blood in all the organs, and in whom the arterial changes are more advanced in the heart.

2. People in whom the arterial changes are proceeding in the heart with greater rapidity and the disease is not capable of being checked and a fatal issue speedily follows.

3. People with damaged valves, especially aortic regurgitation.

4. People whose hearts are embarrassed by having to labor against arterial destruction, as in chronic disease of the kidney with high blood pressure and damaged arteries.

5. A small indefinite group comprising rare conditions impossible to classify.

It will be seen from this classification that MacKenzie gave very little credit to acute cardiac irritants or toxins giving rise to true angina pectoris. It is quite true that he discussed a group of cases giving rise to atypical manifestations similar to angina pectoris which he chose to call pseudo-angina, truly an unfortunate term. Angina pectoris is a real entity, according to our present conception, and the pathology does not permit the recognition of this false type. Attacks of angina are frequently precipitated by taking food. This is especially true if the individual attempts physical effort shortly after taking a meal. It becomes necessary to insist upon this relation of food and effort to the pain of angina, for many patients, and even some doctors, consider the signs very certain evidences of indigestion.

* * *

JOSEPH M. KING, LOS ANGELES.—Much has been written and many speculations indulged in regarding the exact causation of that symptom complex called angina pectoris, and while the true pathology of any condition and its etiology are of the utmost importance, yet our chief concern as bedside practitioners is the correct diagnosis, prognosis, and treatment.

Several heart conditions give rise to anginal pain, and when a patient presents himself it is wise to differentiate these if possible, even when he has as symptoms only the classic triad of substernal or more rarely precordial pain, with radiation to various parts of the body but chiefly the left shoulder and arm, and a sense of impending death during the seizure. Syphilis of the aorta, weakening as it does the resistance of the vessel wall, presents a stretching which often gives rise to a true anginal symptom complex. In this connection it is well to remember that the Wassermann test is not always positive in syphilis of the blood vessels, and in suspicious cases not only should it be repeated but the history should be thoroughly considered and very careful x-ray studies made for possible widening of the vessel. In this way only can one avoid the unpleasant awakening a few years later to the fact that the pathology presented has led on to aneurysm, untreated.

It is well also to remember that the substernal pain may be very low or even absent, and that the radiation of the pain is variable. Due to epigastric

or abdominal distress angina has not infrequently been mistaken for acute gall-bladder disease, gastric ulcer, or even acute perforation from ulcer, renal colic, or acute appendicitis. But a careful consideration of the history, the absence of fever, the normal leukocyte count, the presence of respiratory difficulty, and the age of the patient will usually serve to rule out acute abdominal conditions. The diagnosis of "indigestion" when made on an elderly patient who has distress on exertion after a hearty meal should be looked on with grave suspicion. In fact, if pain in the chest is clearly related to exercise, especially if associated with a full stomach or mental emotion, it should be regarded as anginal unless proved otherwise.

While many emotional states may be accompanied with seeming distress, it is certainly misleading to term them "pseudo-angina" or "false angina." It is also a cloak for our lack of exact knowledge of the particular case, for, as Potain has said, "There are no false diseases; there are only false diagnoses." Many of the attacks termed pseudo-angina are in reality the early manifestations of a malady which will ultimately claim the patient's life. It must be remembered that angina may run a much longer course than was formerly supposed and that many patients suffering with angina have very mild attacks for years. We must also remember that severe anginal attacks, leading even to death, may not be accompanied by severe pain.

On the other hand, now that the laity has become so conversant with the symptoms of various diseases, many neurotic individuals present themselves with a history difficult to evaluate. A sufficient study of the patient, however, serves to show his emotionalism. If the physician is so fortunate as to be present during one or two of these attacks, which seldom give the impression of true pain, he will usually have no difficulty in ascribing these cases to psychic phenomena.

Finally we should not overlook the toxic anginas brought on by tobacco, and possibly occasionally by tea or coffee. These are very easy to determine. The giving up of the supposed deleterious substance is followed very promptly by a cessation of the attacks.

* * *

HARRY SPIRO, SAN FRANCISCO.—In a case of suspected angina pectoris the history is of the utmost importance. A patient may have physical signs, laboratory signs, and x-ray signs showing that an aortitis is present, that a degree of myocardial disease is present, or that hypertension or hypotension exists with no symptoms of pain. That patient has not angina pectoris. His prognosis is better than that of another patient with identical physical and laboratory findings who complains of pain in the region of the heart coincident with exercise and distinct relief by rest. This latter symptom is of utmost importance and almost pathognomonic of angina pectoris.

The points in the history that indicate a true angina are: first, pain with exercise, and second, relief of that particular pain by rest. I do not agree with the author who speaks of "angina pectoris without pain"; I know a patient may have a coronary artery thrombus and no pain.

Of more than ordinary importance is the character of the pulse during an attack of angina pectoris. Very often a physician is led to question the presence of an attack of angina pectoris because the patient has a moderately slow, fairly strong and perfectly regular heart beat during the attack of pain. He may have observed his patient between attacks of pain and noted that the pulse is practically the same as during the attacks of pain. This ordinarily is the rule. It is exceptional (to be noted later), to find a variation in the pulse during an attack. The above character of the pulse is not indicative of the mildness of the condition. A "good" pulse during attacks is not safe datum upon which to base either diagnosis or prognosis.

When, however, in an attack the pulse rate is very fast or the volume or size very small, or the volume very changeable, when the pulse seems to fade out and get stronger again under the fingers, the patient is in deadly peril and the probabilities are that this attack of angina pectoris has been caused by a fresh coronary artery thrombus. When during an attack the pulse becomes small in volume and remains so for days and then develops irregularity, even extrasystoles, death may be imminent. When following an apparent recovery from an attack of angina pectoris produced either by an irritable aorta, a spasm of the coronary, or coronary thrombus, the pulse remains rapid, the patient feels well and anxious to get up, he is still in danger and should not be permitted to get up until the pulse rate has lowered permanently to around eighty-four.

Pain in the heart region, not distinctly related to exercise or relieved by rest, but associated with palpitation coming on without apparent reason may be indicative of ventricular tachycardia. During an attack of ventricular tachycardia the type pulse is a very, very fast run of short or long duration, immediately followed by a slowing of rate and then an apparently rapid increase. At the apex beat, when a rapid ta-ta-ta is heard as fast as can be counted, an exact diagnosis is imperative, and an electrocardiogram should be made. Not infrequently a patient has attacks of pain in the region of the heart or under the sternum, unrelated to exercise or to excitement but to an attack of palpitation of very rapid heart action of which the patient is conscious. This may be merely an arrhythmia of some sort which if relieved may permanently cure the patient of attacks of so-called angina pectoris. This arrhythmia may be either extrasystoles, auricular or ventricular, in series, causing tachycardia or the above mentioned ventricular tachycardia, both of which conditions are frequently and brilliantly relieved by quinidin.

I believe there is a relationship between the degree of pain and the prognosis, that is, the greater the pain the more dangerously ill the

patient; the easier to produce pain the more dangerous; the length of time the pain lasts—the longer the duration of pain the more severe the case; the quicker the relief with drugs the less dangerous the case; and attacks of pain markedly increased in frequency call for extreme caution; however, some patients only have one or two attacks of pain and then death.

* * *

J. MARION READ, SAN FRANCISCO.—If every patient with albuminuria had Bright's disease, if every one with a murmur had endocarditis, and if precordial pain radiating down the arm always meant angina pectoris, etc., the diagnostic problems of the internist would be greatly simplified.

While true angina pectoris describes a fairly definite clinical picture there are no characteristic physiologic or anatomic changes found ante- or postmortem. It is probably because of this fact that the term "angina pectoris" has been used to describe almost all precordial or substernal pain radiating down the left, or right arm, or both.

When used in this sense the term really represents a symptom complex rather than a clinical entity. But as bedside physicians, it is in this guise that diagnostic problems present themselves to us.

While the greatest number of disease states in which this sensory symptom complex occurs are cardiac, or circulatory, it may be found also in mediastinitis, herpes zoster or, perhaps more frequently, in the radicular syndrome.

Typical anginal pain may occur in paroxysmal tachycardia, or anemia (especially the pernicious form), and in hypothyroidism. In all of these the heart itself may be organically sound, but the seat of the pain is nevertheless in the heart. Typical anginal pain may occur also in aortic insufficiency. Anginal pain occurs in coronary artery disease, including thrombosis and in true angina pectoris. There may be some question as to whether or not the same pathologic changes underlie both diseases, but I refer to true angina pectoris to designate the clinical picture described by William Heberden, who chose the term "angina" because of the sensation of pressure or constriction which is such a prominent symptom of this condition, and which the term really means. Heberden wrote, "The seat of it and the sense of strangling, and anxiety with which it is attended, may make it not improperly to be called angina pectoris."

But by long usage the term "angina" has come to be translated *pain,* rather than *suffocation,* and there are described under the heading of angina pectoris almost every cardiac affection associated with pain. For purposes of prognosis, treatment and further study of cardiac disease characterized by pain, it seems logical to restrict the term "angina pectoris" to the small group of cases which so clearly fit the description given by Heberden, namely, those whose attacks are produced nearly always by exertion, are accompanied by an alarming sensation of suffocation, pain, and impending death, in whom the attack ceases with absolute immobility and who usually die suddenly.

It seems probable that the pain which occurs in true cardiac affections (excluding pericarditis and aortitis) is in the great majority of cases due to anoxemia of the heart muscle, either relative or absolute. Disease of the coronary arteries, anemia, and hypotension, all predispose to myocardial anoxemia and all these may, singly or in combination, be factors in precipitating attacks of angina pectoris.

Despite the same age incidence and the frequent necropsy finding of coronary artery changes, there is an additional nervous factor which plays a prominent part in angina pectoris. Brain workers, those with highly organized nervous systems, the "high strung," nervous, emotional and mentally active individuals seem predisposed to this dread disease. It occurs in almost epidemic form following financial crises, earthquakes, wars, and other calamitous happenings. It is much more frequently encountered in private practice than in clinics or hospitals for the poor. The same cannot be said of coronary thrombosis, which seems to strike rich and poor alike. Incidentally, the latter disease may occur without pain, although the accompanying objective signs are numerous, while in angina pectoris these are usually few, if any, while the subjective manifestations take first rank among those of all other diseases.

In the last twenty years the work of Herrick and others has established coronary thrombosis as a clinical entity and its subjective, as well as objective, manifestations are usually distinguishable from true angina pectoris. I cannot, therefore, agree with the previous writer when he says that an "attack of angina pectoris has been caused by a fresh coronary artery thrombosis."

The action of nitrites in angina pectoris and the seemingly favorable results which have attended cervical sympathectomy in some cases are features which warrant further consideration and tend to distinguish this disease from coronary thrombosis.

* * *

WILLIAM DOCK, SAN FRANCISCO.—The occurrence of substernal (usually not submammary) distress, on effort, excitement, or exposure to cold, which is relieved by rest (often in the erect posture) or by nitrites, is sufficient for a "working diagnosis" of angina. If the pain occurs more after meals, on ascent but not on the level, and radiates into arms or upper abdomen, the impression is strengthened. Absence of all physical evidence, by x-ray, electrocardiogram, blood pressure, and physical examination does not alter the diagnosis. The pain may be partly abdominal and accompanied by nausea, but the relation to effort is typical and of the greatest importance.

Similar pain, of longer duration, and even occurring at rest may be due to paroxysmal tachycardia, thyroid disease, profound anemia, aortic stenosis or insufficiency, or to occlusion of a coronary artery, and should be sharply differentiated from pure angina pectoris.

The prognosis varies with frequency, severity, and duration of disease. The longer the disease

has lasted without increase in severity the better the prognosis, and the greatest care should be given to those who have had only a few attacks. Very severe attacks may recur for many years and hence no absolute prognosis can be given. Certain physical findings: pulsus alternans (as noted in taking systolic pressure); gallop rhythm on exercise; hypertension increased during attacks; abnormal ventricular complexes in the electrocardiogram, all suggest a shorter course. There is no marked correlation between senile sclerosis of the aorta, which Doctor Spiro includes in the x-ray diagnosis of "aortitis" and severity of heart disease. Anatomically the root of the aorta and coronaries may be severely damaged, even by syphilis, with no change in the arch, and severe sclerosis of arch and descending aorta occur often with the root of the aorta and coronaries undamaged.

As to therapy, rest (especially after meals), moderation in eating, drinking, and exercise are of greatest importance. The most useful drug is nitroglycerin, to be taken under the tongue for attacks of pain, or on occasions such as stair-climbing, sexual intercourse, etc., which predispose to attacks. Theobromin in ten-grain dose three times a day for prevention of attacks occasionally gives a satisfactory result; theocin and euphyllin but rarely succeed when this fails, but should be tried. Superior cervical sympathectomy is often effective and is less dangerous than other types of operative treatment.

Blindfolded Pilots Fly Spiral Courses.—Experiments conducted have demonstrated that, when blindfolded, an airplane pilot will nearly invariably show the same tendency to deviate from the straight path of flight and take up a spiral one, that a blindfolded person does when in motion on the ground, it was stated September 7 by the National Advisory Committee on Aeronautics.

The statement in full text follows:

Tradition says that the normal tendency of a man who is walking without visual reference, as when lost in a forest or in a dense fog, is to take a circular path.

This traditional tendency has been investigated experimentally and reported upon exhaustively by Dr. Asa A. Schaeffer of the zoölogical laboratory of the University of Kansas. He finds that, whether walking, swimming, rowing a boat, or driving an automobile, the tendency of a blindfolded person is always to follow a spiral path.

Such a tendency would naturally be of greater importance in flight than perhaps anywhere else, and it was the intention of these experiments, carried on by the National Advisory Committee for Aeronautics at Langley Field, Virginia, to determine whether the same tendency normally appeared in the piloting of aircraft.

For the purpose of these experiments, a dual control VE-7 airplane was used. The subject pilot was placed in the front seat, which was located approximately at the center of gravity of the airplane. In this position the subject pilot was less influenced in piloting by the accelerations. A safety pilot, who also served as observer, occupied the rear seat.

A face-mask type of goggles, in which the glasses were replaced by light-tight pieces of cardboard and black paint, was used as a very effective blindfold.

The subject was usually directed to take off and fly to some safe altitude at which steady air conditions existed, in the meantime getting accustomed to the flying qualities of the airplane. At this point the observer took over the controls, and the subject pilot assumed the "blind condition" but putting on the goggles.

The airplane was then brought into position for straightway flight by the observer and turned over to the subject pilot, who then attempted to maintain straight flight.

It was found, without exception, that no subject pilot maintained a straight flight path for any appreciable time, but soon brought the airplane into a properly banked turn, which was maintained for varying periods. This circling flight, after a few turns, frequently assumed a shorter radius with a consequent greater bank, terminating in the nose dropping well down into a diving spiral.

At this point the safety pilot reassumed the control and placed the airplane again in straight flight or in a wide turn to the left or right, and the subject pilot then attempted to attain and maintain straight flight, as previously explained. There appeared little difference in the results, whether they started in straight flight or in a turn.

A continuous record was kept during the intervals of flight made by the subject pilot. By assuming a zero starting point at the beginning of each flight, it was possible to follow the course of the airplane, including at the same time information in regard to the degree of bank, air speed, and any unusual maneuver that the pilot made in his endeavors to maintain a straight course.

In the total number of cases examined, it was found that equally as many turned to the right as to the left, while a very small proportion of the flights showed a heterotropic tendency, that is, to turn in either direction, or to reverse directions in a single flight. Whether the subject pilot was right- or left-handed made little difference in this respect.

Many pilots have felt that the flying sense was largely one of muscular balance and that visual reference played a more or less insignificant part. These experiments should serve to remove this idea, and develop appreciation of the fact that muscular balance plays an extremely small part in flying, excepting in correlation with visual reference in the development of a polished technique.

Visual references of some sort must be provided, either by the horizon, or by the reflection of the sun or moon while in dense fog or clouds, or by proper instrumental equipment.

It will be noted that these experiments in no way parallel any normal condition of flight, since, being blindfolded, the subject pilot had absolutely no opportunity for visual reference of any kind, a condition which seldom could occur in actual practical flight.

The fact should not be neglected that the use of proper navigational instruments provides an artificial horizon, if not in a single instrument, then in the correlation of several instruments, such as a turn and bank indicator and an air-speed meter.—*United States Daily,* September 9, 1929.

First International Congress on Mental Hygiene will be held at Washington, D. C., May 5 to 10, 1930. Many subjects are listed on the program of the First International Congress on Mental Hygiene, just received from John R. Shillady, administrative secretary, 370 Seventh Avenue, New York City. Practically all aspects of mental hygiene will be covered at the congress. Details of the program have been worked out by a committee of which Dr. Frankwood E. Williams, medical director of the National Committee for Mental Hygiene, is chairman, collaborating with correspondents in many countries. Topics are now ready for publication, and are contained in an informing thirty-three-page *Preliminary Announcement,* obtainable from headquarters office. The congress will be held in Washington, D. C., May 5 to 10, 1930. President Hoover accepted the honorary presidency of this congress, and delegates are expected from more than thirty countries.